MassGIS Data Viewer   *Student Training*
Focus: Watersheds…….Ecological Address
Regional Perspective   Lesson #2
Introduction

Social Studies
Mathematics
Language Arts
Science

"Sub-Watersheds in Your Community"

Background: From Lesson #1, we learned that Massachusetts has several "Mega" Watersheds. Most of these watersheds also collect water from other states. However, within a "Mega" Watershed we find many smaller watersheds called sub-watersheds that collect water from smaller land areas. In our MassGIS information these sub-watersheds are called "Major" watersheds. They collect the water from relatively smaller areas, carry it to the larger "Mega" watersheds that eventually discharge the water to the ocean. These "Major" watersheds are usually named after the major stream system carrying the water to the "Mega" watershed.

Problem: Assume some high levels of fertilizer (nitrates and phosphates) have been found in one of the "Mega" watersheds identified in Lesson #1. The Massachusetts Watershed Coalition (MWC), has contacted the smaller watershed groups within each Mega basin., and also the community Conservation Commissions. The MWC is asking the community and watershed groups to begin the process of identifying the location of land-uses that could potentially be contributing to the increase in fertilizers in the water systems. To accomplish this challenge, we will need to first identify the major watersheds and communities within these watersheds.

Your Task: Using the MassGIS Data Viewer, identify the "Major" watershed or watersheds that comprise your community, and all the other communities that are included in these watershed areas. You will need to make a View that shows all the needed information, and a Data Sheet based on your Viewer information.

Mass Data Viewer Skills:
- *Beginning the Viewer (Opening a Project)*
- *Arranging Themes in the Table of Contents*
- *Window Bars (Menu, Button, Tool)*
- *Using the Legend Editor*

- *Adding Themes to a View*
- *Working with Tables*
- *Creating a Layout*
- *Labeling Theme Features*

Viewer Buttons and Tools:
- *"A" Button*
- *Auto Label Tool*
- *Pointer Tool*

- *Identification Tool*
- *Text Label Tool*
- *Query Tool*

MassGIS Data Viewer *Student Training*
Focus: Watersheds……. Ecological Address
Regional Perspective   *Lesson #2*
Data Viewer Skills

Social Studies
Mathematics
Language Arts
Science

"Sub-Watersheds in Your Community"

Creating a Sub-Watershed Layout for Your Community

1. Beginning the Viewer:

a. Go to the start icon in the lower left window of your computer screen.

b. Holding the left mouse down, select "programs" and slide the mouse cursor over to the "MassGIS Runtime Data Viewer" and over again to the MassGIS Runtime Data Viewer. Release the mouse.

c. A window or several windows will appear on you screen.
MassGIS Runtime Data Viewer
Av30mg2.APR
MassGIS Data Viewer

d. Maximize the MassGIS Data Viewer window with the mouse cursor – click on the middle box of three boxes in the MassGIS Data Viewer Title Bar. This will maximize the Viewer window so it fills the entire computer screen.

2. Adding Themes to the View

a. We will use the "A" button located in the button bar at the top of the screen.

b. With your mouse cursor, click on the "A" button. A new window opens on your screen, "Layer Categories".

c. Scroll down through the list and double click on the "Physical Resources" listing.

d. With your mouse, scroll down through the choices under "Specific Layers" and double click on "Watersheds".

e. A new widow will open, select "Mega Basins". Click OK. The theme "Mega Basins" is now added to the Table of Contents in our View.

f. Continue the process described in steps a-e above until the following themes have been added to your View's Table of Contents:

Layer Categories	Specific Layer	Specific Layer
Physical Resources	Watersheds	Watershed..Outlines
Physical Resources	Hydrography (water Features)	Lakes and Ponds.. Major

3. Adjusting the Order of Themes in the Table of Contents

a. In order to see the community outlines, move the "MA Town Boundaries" to the top of the Table of Contents.
Hint: Click once under the Title of the "MA Town Boundaries" theme, and holding down the left mouse key, drag the theme to the top of the Table of Contents.

b. Your Table of Contents Themes should appear in the following order:

MA Town Boundaries
Maj Ponds
Major Basins
Mega Basins

4. Making Themes more Visible in the View (Using the Legend Editor)

a. In order to see the major basin outline against the Mega basin layer, we will need to change the Major Basin outline color.

b. Double click anywhere in the Mega Basin Table of Contents theme area. Double clicking will activate the Mega Basin theme and also open its "Legend Editor". We will begin by changing the "Values Field" to "Name" – with your mouse cursor, click on the upside down triangle and scroll through the list. Select "Name".

c. We will change the major basin theme outline color to a bright red. For this outline color to show, we need to eliminate the red shades from the Mega Basin theme.

d. Notice in the "Legend Editor" window that there is a box at the bottom of the editor window called "Color Schemes". By placing the mouse cursor over the upside down triangle in the "Color Scheme" box, and holding the left mouse down, you notice several other combinations of colors are available

e. Using the mouse cursor, scroll down through the list and select "pastel" and click Apply.

f. Close the Legend Editor window.

g. Double click next to the Major Basin Table of Contents Theme (from now on we will simply say " make the xyz theme active"). This will activate the "Major Basin" theme and open its Legend Editor.

h. With the "Legend Editor" window open, double click in the "Symbol" box. A Fill Palette will appear. Notice at the bottom of the "Fill Palette" window the word "outline" appears. Using the mouse cursor, scroll through the outline box and select #2. Notice the thickness of the outline changes in the symbol box.

i. With the "Fill Palette" window still open, locate the "Paint Brush" icon in the "Fill Palette" window and click once. A new window "Color Palette" appears.

j. In the color box, place the mouse cursor on the upside down triangle and click once. Select "outline" and click once.

k. Note a color is squared/outlined in black, this is the current outline color of the "Major Basin" Theme. Locate a bright red colored square, and click once on the color. The outline shown in the symbol window should now change to a red color. Click Apply.

l. Close the Legend Editor window by clicking the "X" in its upper right corner. The "Major Basin boundaries" should now appear red in your View.

5. Adding Names to the Major Watersheds Using The Auto Label Tool.

a. Go to the "Window" menu, select "Show Symbol Window". A Fill Palette window appears over the View window.

b. Click once on the "ABC" icon. Select the "Font" type of "Arial". Make the size "12", and the style "bold". Close the Fill Palette window.

c. With the Major Basin theme activated go to the theme menu and select "Auto-Label" in the "label field" be sure "name" has been selected. Check off "Find Best Label Placement, Remove Duplicates, and Scale Labels". Click OK. All the major basins are now labeled in the View.

6. Locating Your Community Using the Query Tool

a. Make the "MA Town Boundaries" theme active.

Shirley L. Griffin, Ed.D.
McAuliffe Fellow

b.   Under the Theme menu, select "Table".

c. When the Table opens, go to the Table menu and select "Query".

Hint: This can also be done by clicking once on the "Query" button represented by a hammer icon.

d.   When "Query" has been selected, a window opens over your View "Attributes of MA Town Boundaries".

e.   Double click on [Town]. Double clicking will place the word "Town" in the formula box, and also show the names of the towns in the "Values" column. The actual names are coming from the MA Town Boundaries table.

f.   Now in the mathematical symbol area click once on "=". Notice the equal sign appears in the formula window.

g.   Scroll through the values list until you find your community's name. Once you have found it, double click the name. Notice your community's name has been added to the formula.

h.   Click "New Set". The Table will highlight the town selected in a yellow color Close the "Attributes of MA Town Boundaries" Query window, but not the Table.

i.   With the mouse cursor, move the scroll bar to the right of the table to the top, so the beginning of the table is shown. At this point if your town is not near the top, you can not see it in the table. We will use the "Promote" button to correct this.

j.   Using your cursor, select the "Promote" button by clicking once on the promote button icon. Notice your community is now moved to the top of the Table and is shown in yellow. Close the table.

7. Making Your Community Visible in the View

a.   Activate the "MA Town Boundaries" theme if not already activated. Open its Legend Editor. Double click on the "Symbol" box. In the Fill Palette window you should see a white box with a square around it. This is currently making the foreground of "MA Town Boundaries" theme transparent.

b.   To see your selected community, you need to make the foreground of "MA Town Boundaries" theme have a solid color. With the mouse, click on the black box. Close the Fill Palette window and click apply in the Legend Editor window. Close the Legend Editor window.

c.   When you look at your View, you notice several changes have occurred. First the towns are a solid color with your community appearing yellow. Because the MA Town Boundaries is now a solid color and at the top of the Table of Contents, it is blocking all of the other theme layers.

d. To see the Major Basins around your community, drag the "Major Basins" theme layer to the top of your Table of Contents.

8. Labeling Your Community

a. Make the "MA Town Boundaries" theme active. You will begin by labeling your community. Go to the Window menu and select "Show Symbol Window".

b. Click on the "ABC" icon. Make the Font "Arial", the size "12", the style "bold". Close the Font Palette Window.

c. With your cursor, click on the "Label" Tool. Select the "Call Out Label".

d. Move the "Label" cursor over your "yellow" selected community and holding down the left mouse, drag out a line into the white space in your View. *(1) Record the Major Basin or Basins where your community is located.* (Data Sheet)

Hint: If the name of the Basin appears in a "text properties" box , the call out label will not draw . It is probably because the basin name is located over your community. You will need to lower or raise the Basin name by moving it away from your community. To do this make the cursor a "pointer" or "arrow". Click on the basin name. Holding down the left mouse, drag the basin name so it is not over your community, but it is still in the correct basin area. Now repeat steps a, b, c, d in Step #8 above.

9. Identifying other Communities in your Basin.

a. We will begin by changing the "MA Town Boundaries" theme back to transparent. Double click the MA Town Boundaries entry in the table of contents, opening the "Legend Editor" window.

b. Double click the symbol box in the Legend Editor. In the Fill Palette window change the solid color back to transparent by clicking the all white box . Close the Fill Palette window and click Apply in the Legend Editor. Close the Legend Editor window.

c. Make the MA Town Boundaries theme active if it is not already active.

d. With you cursor, select the "Identification" tool by clicking the "I" icon once in the tool bar.

e. Using your mouse, place the "I" over each town that is completely within your community's major basin. *(2) On your Data Sheet, list all the communities in your basin that are totally within your basin.* (Data Sheet)

Hint: As you click the "I" tool an "Identify Results" window appears over your View. Keep clicking as you move the "I" tool over the communities. There is no need to close the "Identify Results" window until you are done. When you are finished, close the "Identify" window.

f. We will zoom into your community watershed to get a closer view of your community's boundaries. Click on the magnifying tool (shown as a + in a circle).

Holding down the left mouse key, drag a rectangle slightly larger than the Basin where your community is located. Release the mouse. Your View now shows an enlarged close-up of your community's Basin.

g. Once again select the "I" tool with the mouse cursor, but now identify the names that are only partly in your Basin. **(3) List the communities that are only partially within the Basin watershed.** (Data Sheet)

h. When finished, close the identification window. Change the mouse cursor back to a pointer.

i. Return the View to the previous view size. Place the mouse cursor on the "zoom to previous extent". Click once.

10. Naming the Mega Watershed in your Basin
a. Open the table of the "Mega Basin" theme. Select the field "name".

b. Open the Window dropdown menu. Select the "Show Symbol Window" Make the font "Arial", the size "12" and the style "bold". Close the Table.

c. Use your cursor to select the "Text" tool and click once in the Callout Text". The cursor becomes a circle and a dot. Click the cursor in the white space below the state shape. In the "Text Properties" window, type the Basin Name Watershed (Mega Basin). See the example below. Click the center box.

<div align="center">

Merrimack Watershed
(Mega Basin)

</div>

d. Click the pointer tool to change the mouse cursor back to pointer.

11. Determining the Acreage in the Major Basins
a. Make the "Major Basin" theme active. Use the Identification tool to determine the number of acres in your community's basin. **(4) Record the number of acres for the basin and its square miles in your Data Sheet.** (Data Sheet)

b. Repeat the same procedure to find the number of acres and square miles for each of the major basins that comprise your community's Mega Basin area. **(5) Record the acreage and square miles of each basin.** (Data Sheet)

c. Return the cursor to the "pointer" tool.

12. Making a Layout and Exporting it as a JPEG file.

a. Go to the View menu. Select "Layout". In the "map output" window, choose 8.5 x 11. Click OK. For the title enter "My Community's Major Watersheds". Type the title in all capital letters. Click OK.

b. In the "Setting Pagesize & Margins", Click OK. Make the Template Manager "Landscape" and click OK.

c. We will now add an explanation box to our Layout. Go to the Window menu. Select "Show Symbol Window" Click on the "ABC" icon. Select the font a "arial", the size as "16", and the style as "bold". Close the window.

d. Go to the "Text" tool. Select "banner text". The cursor changes to a dot within a circle. Move the circle cursor into the layout. Click once with the left mouse. Type the following making several lines of text. Use the example below:

> Merrimack Sub-watersheds:
> Nashua
> Shawsheen
> Merrimac
> SuAsCo

Remember you should be typing your Basin's name and its sub watershed basins. Click OK.

e. Make the cursor a pointer. Click on the new explanation box that is now printed in the Layout. Holding down the mouse cursor, move the box so it is under the map within the white area of the layout. Be sure it does not hide any other elements of your Layout.

f. Go to the file menu, and select Export. In the Export window, be sure you select the file where you want to store the Layout image for later use. We suggest c:\windows\temp. Under "List Files of Type select JPEG. In the File Name, type: SubWater#2.jpg. Click OK.

g. Close the Data Viewer windows and program.

MassGIS Data Viewer   *Student Training*

Focus: **Watersheds……. Ecological Address**

Regional Perspective   *Lesson #2*

Data Sheet

| Social Studies |
| Mathematics |
| Language Arts |
| Science |

"Sub-Watersheds in Your Community"

Name: _____ Date: _____

1. List the major basins where your community is located.

| |
| |

2. List all the communities fully within your community's major basin or basins.

| |
| |

3. List all the communities partially within your community's major basin or basins.

| |
| |

Shirley L. Griffin, Ed.D.
McAuliffe Fellow

4. Record the number of acres and square miles in your community's major basin or basins.

5. Record the acreage and square miles of each major basin located in your Community's Mega Basin.

Major Basin Name	*Acreage*	*Square Miles*